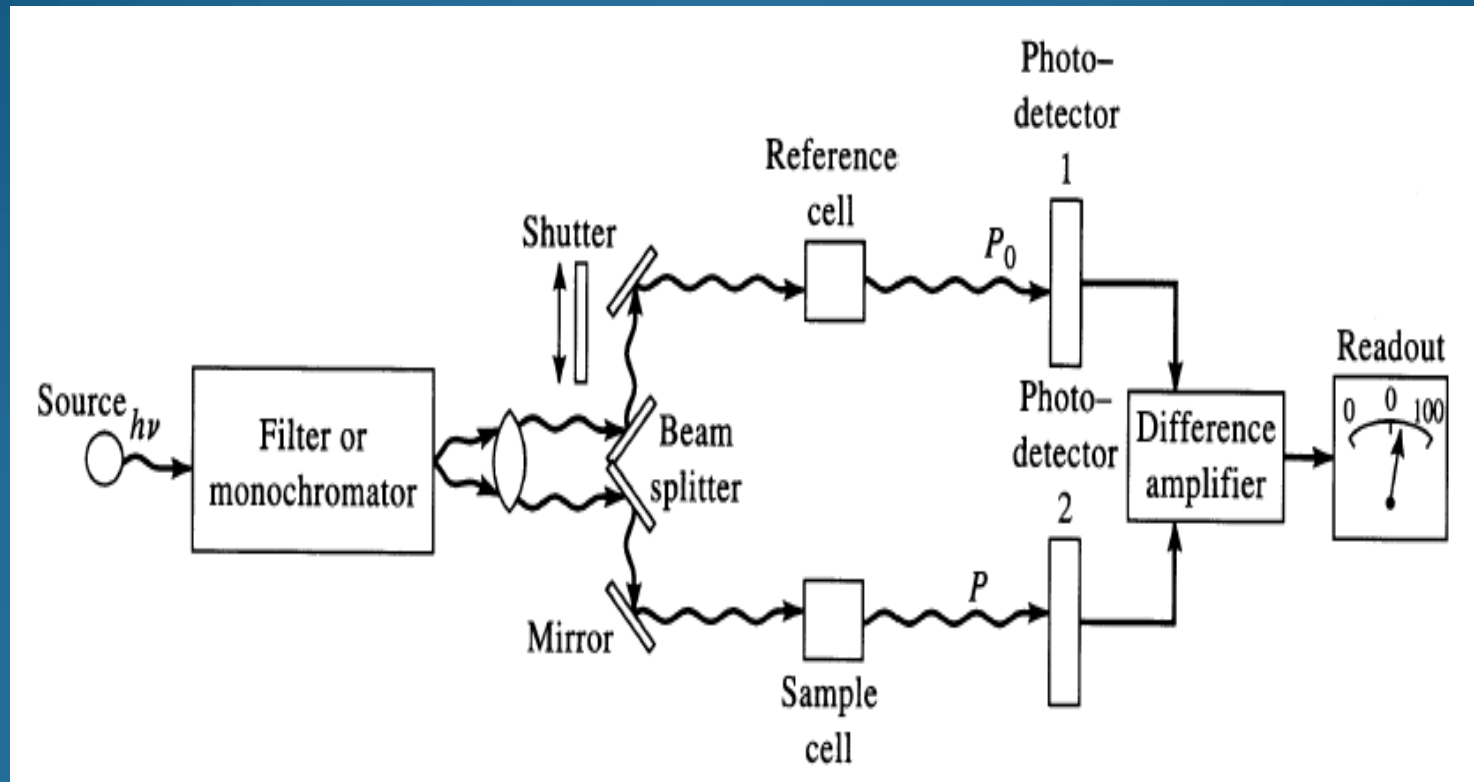# Continuous Monitoring of NO2+NO3 in Surface Waters of New Jersey

New Jersey Water Monitoring Council

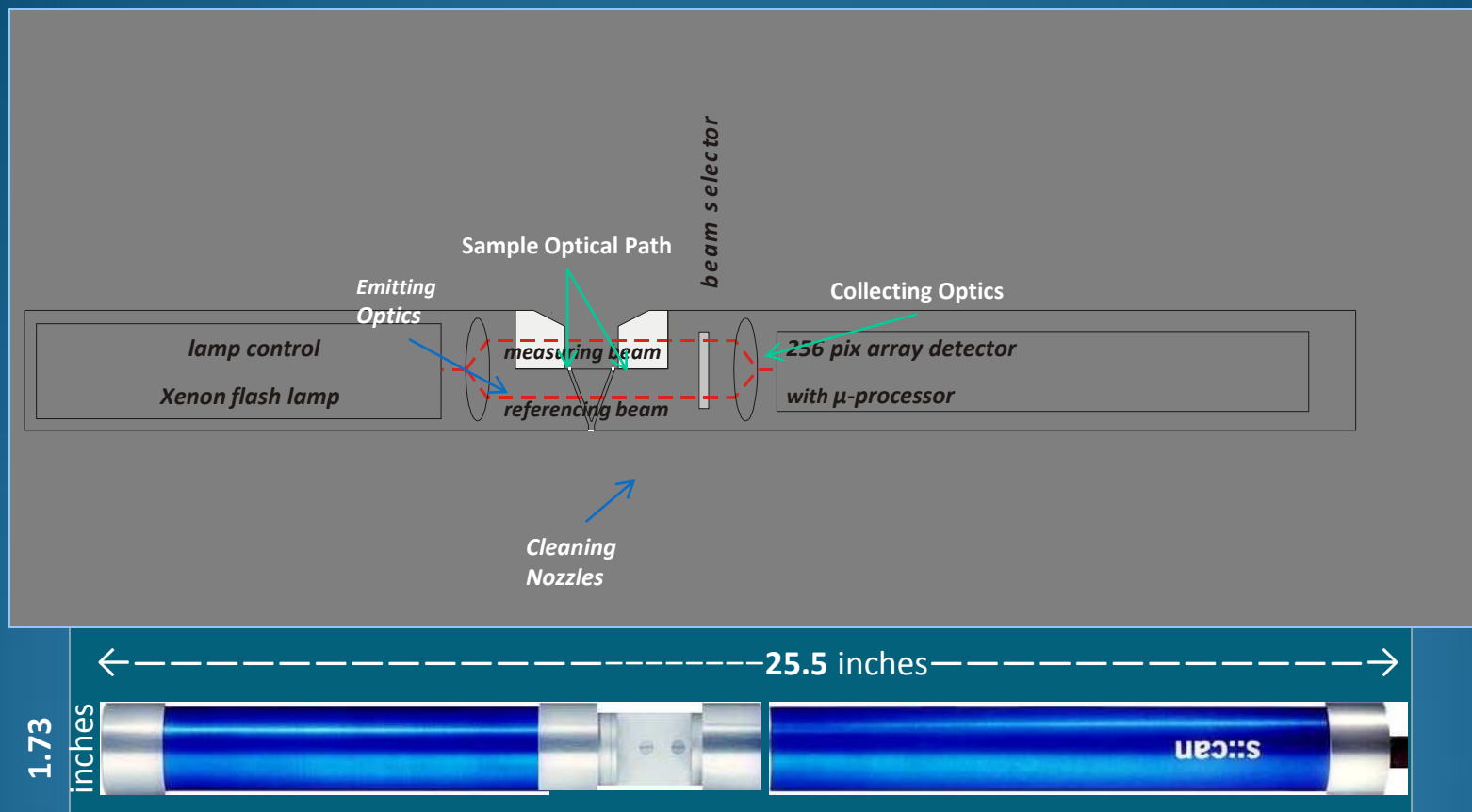September 30, 2009

USGS
science for a changing world

Conventional UV/ Visible Light Spectrophotometer
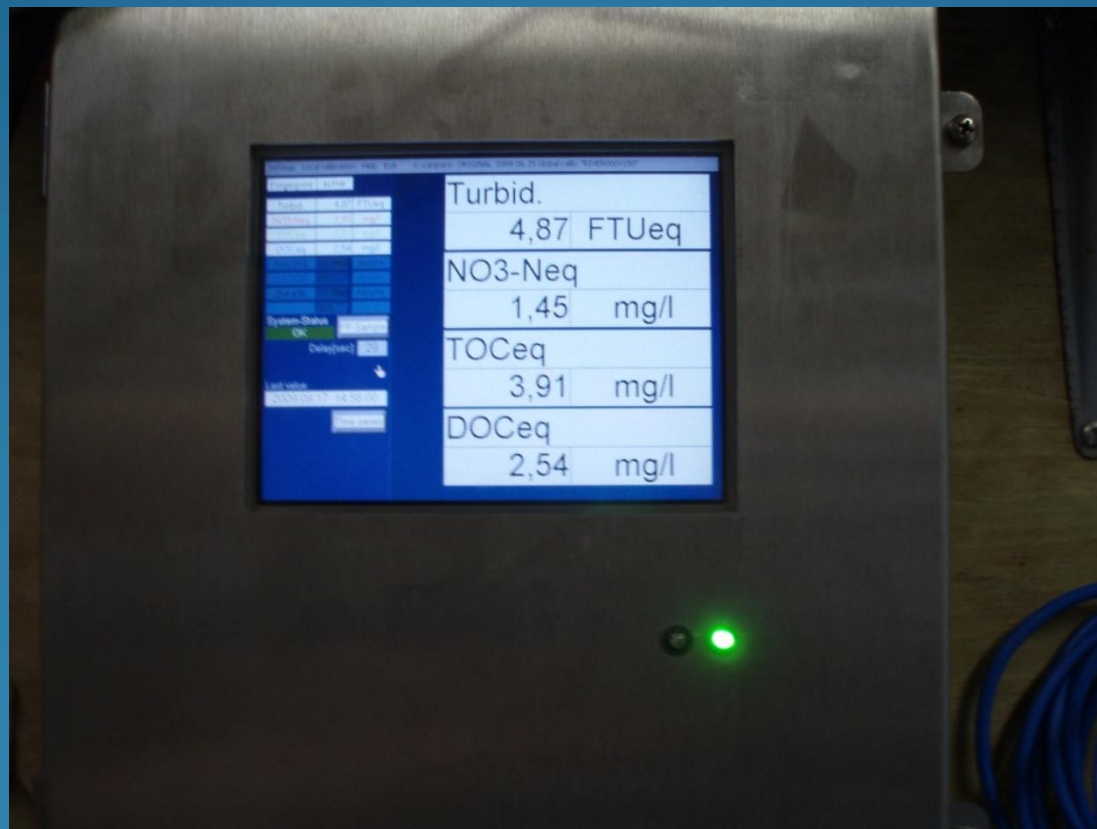
The Spectrometric Process Analyser

How does it work?
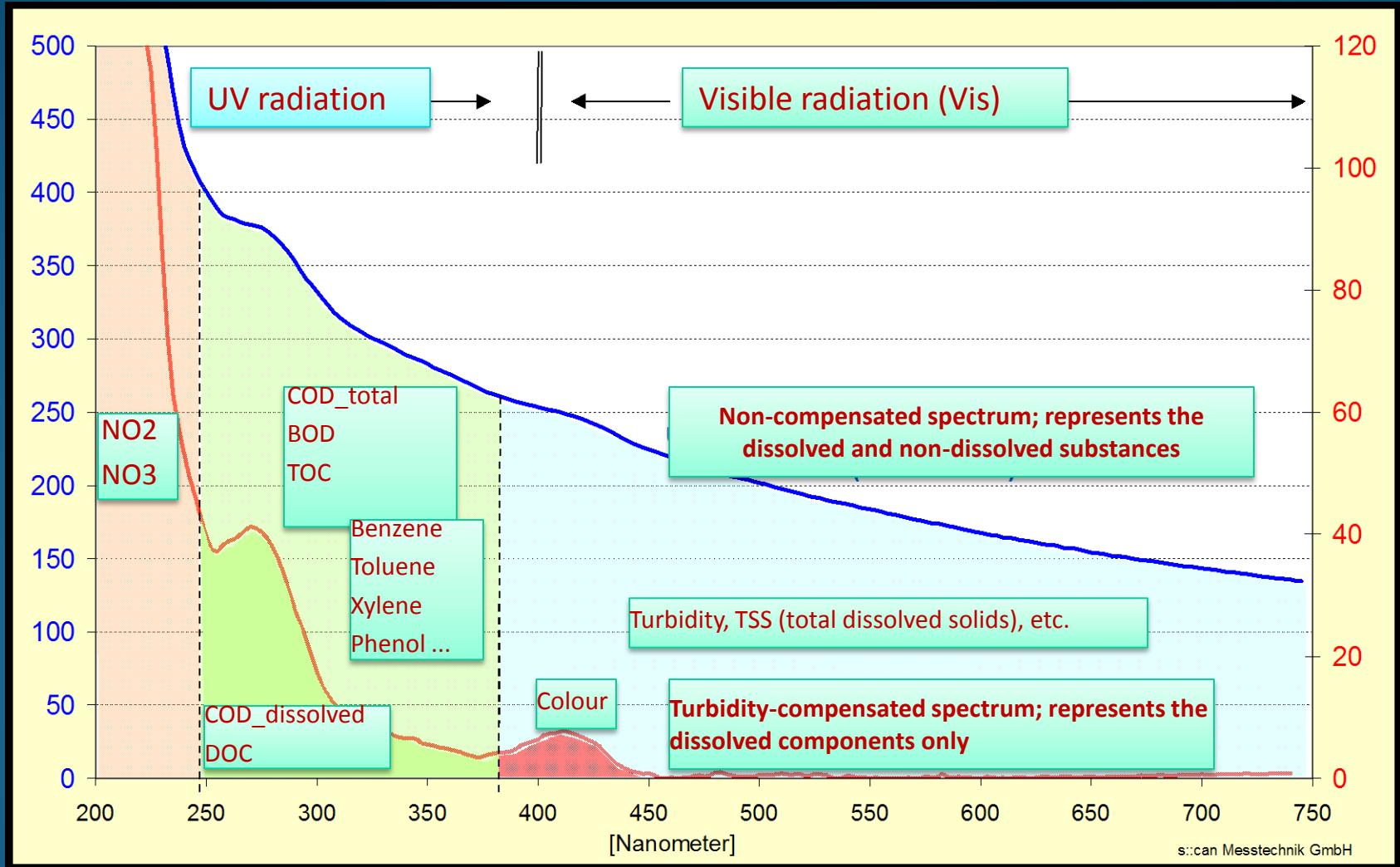

4 Types of data estimated NOx, TOC, DOC, turbidity

Control Panel with Display

The Spectrometric Process Analyser

The Measuring Principle - Fingerprint

Calibration

1) **Global calibration** --A "fingerprint" created using thousands of spectra from thousands of samples from <u>many different water bodies</u> and statistical relations are determined using vendor software based on PCA (Principal Component Analysis) and PLS (Partial Least Square Fit)

2) **Local calibration** – A "fingerprint" created using the water matrix for a <u>specific water body or stream reach</u> relating user provided lab analyses to UV-Visible spectra using the same vendor software as above

3) Generate your own relations for different water-quality constituents from unprocessed spectral data and lab analyses

Comparison of lab and S::CAN NO2+NO3
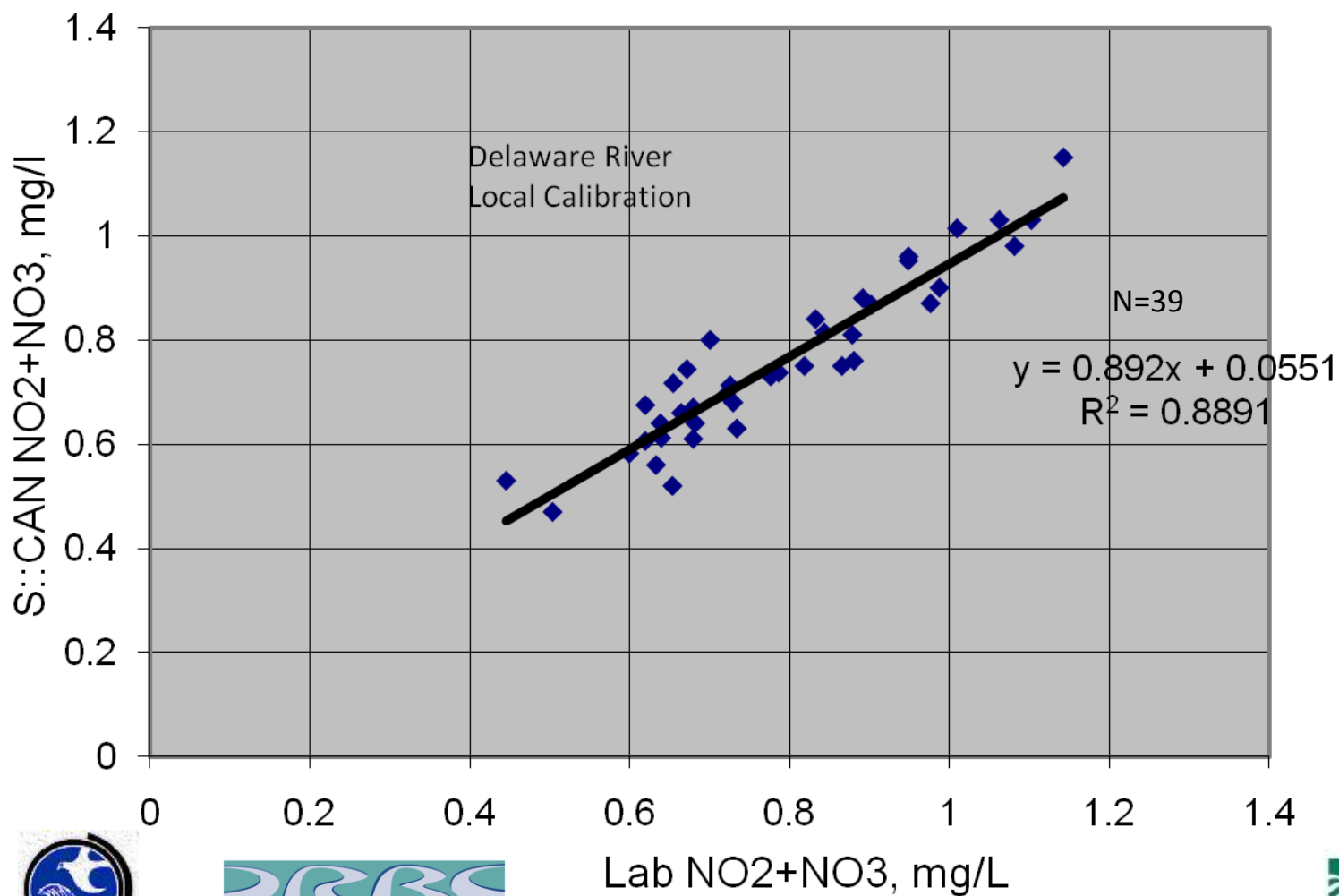
Collecting a Concurrent Sample for Lab Analysis

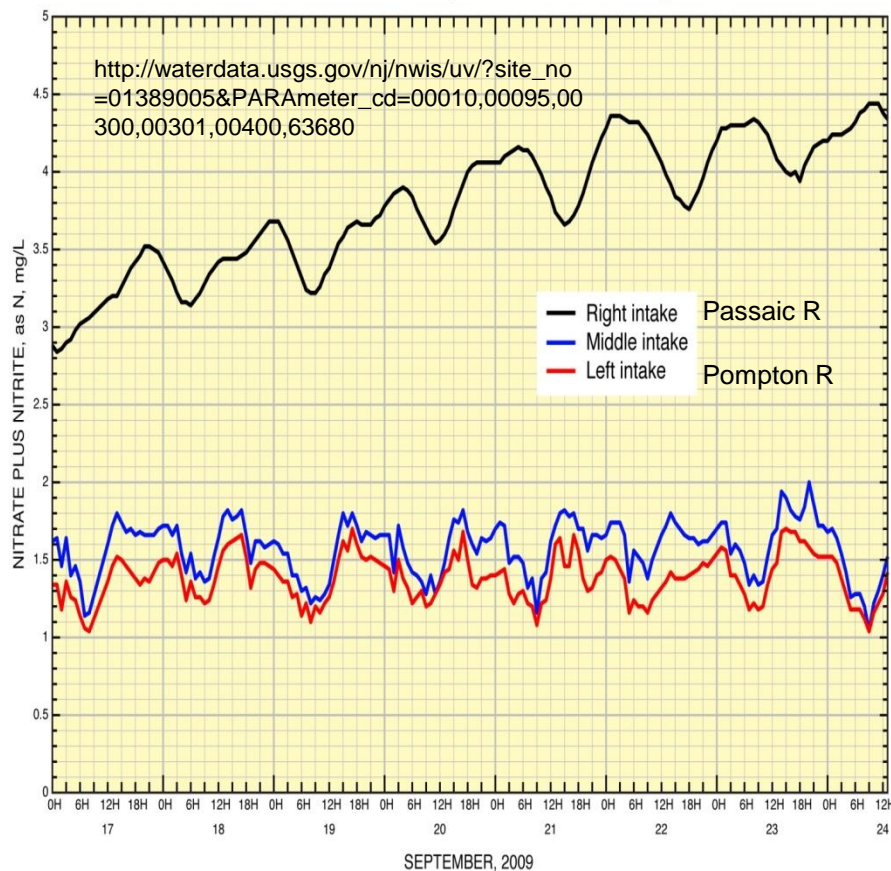# Patterns of Nitrate Variability & Evaluation of Mechanisms

Conclusions for Delaware River @ Trenton:

- Strong link to hydrologic events, but with unique signatures

- Daily and weekly variations moderate to strong

- Diel fluctuations linked to:
  - → Primary Production (pH, DO link)
  - → Temperature (microbial activity?)
  - → Discharge, including peaking hydropower

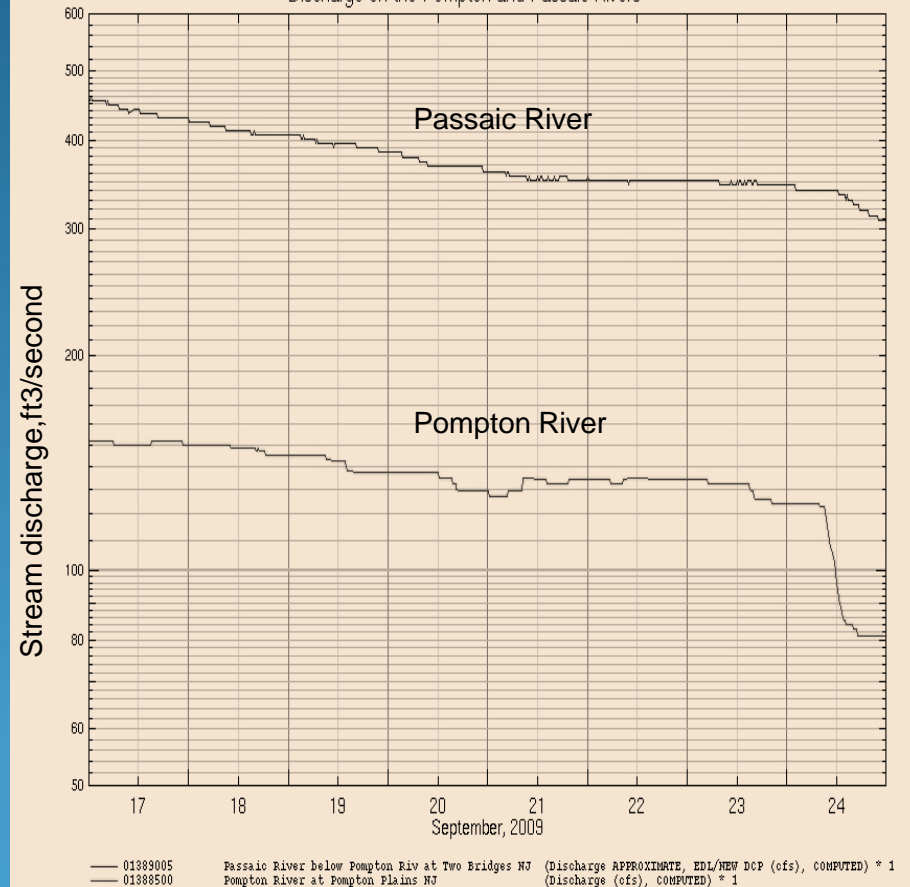- Seasonal changes not observed (summer vs fall)

Delaware River Basin Commission
DELAWARE · NEW JERSEY
PENNSYLVANIA · NEW YORK
UNITED STATES OF AMERICA

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Continuous NO2+NO3
from 9/17 to 9/24/2009

Passaic River below Pompton River at Two Bridges, NJ

http://waterdata.usgs.gov/nj/nwis/uv/?site_no =01389005&PARAmeter_cd=00010,00095,00 300,00301,00400,63680

Right intake — Passaic R
Middle intake
Left intake — Pompton R

SEPTEMBER, 2009

Discharge on the Pompton and Passaic Rivers

Passaic River

Pompton River

Stream discharge,ft3/second

September, 2009

01389005   Passaic River below Pompton Riv at Two Bridges NJ (Discharge APPROXIMATE, EDL/NEW DCP (cfs), COMPUTED) * 1
01388500   Pompton River at Pompton Plains NJ   (Discharge (cfs), COMPUTED) * 1

Sample Tank and Automated Cleaning of Optical Windows

Bottom Filling of Tank Produces Low Turbulence for good D.O. measurement